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U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Station OP1-17  
Washington, DC 20555

**SUSQUEHANNA STEAM ELECTRIC STATION**  
**LICENSEE EVENT REPORT 50-388/2002-004-00**  
**PLA-5555**

**Docket 50-388**  
**License No. NFP-22**

Attached is Licensee Event Report (LER) 50-388/2002-004-00. This event is reportable per 10 CFR 50.73(a)(2)(iv)(A) in that Susquehanna Unit 2 experienced an unplanned automatic actuation of a system provided to mitigate the consequences of a significant event. The Reactor Protection System actuated following a Main Turbine trip due to low condenser vacuum. The loss of condenser vacuum occurred when 120 Volt AC power underwent a momentary transient during maintenance activities which resulted in an Offgas system shutdown. There were no actual consequences to public health and safety as a result of this event.

Richard L. Anderson  
Vice President - Nuclear Operations

Attachment

cc: Mr. H. J. Miller  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

cc: Mr. S. L. Hansell  
Sr. Resident Inspector  
U.S. Nuclear Regulatory Commission  
P.O. Box 35  
Berwick, PA 18603-0035

IE22

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [bjs1@nrc.gov](mailto:bjs1@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

## 1. FACILITY NAME

Susquehanna Steam Electric Station - Unit 2

## 2. DOCKET NUMBER

05000388

## 3. PAGE

1 OF 3

## 4. TITLE

Unplanned RPS Actuation - Loss of Condenser Vacuum and Reactor Scram

## 5. EVENT DATE

## 6. LER NUMBER

## 7. REPORT DATE

## 8. OTHER FACILITIES INVOLVED

MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	30	2002	2002	- 004 - 00		11	27	2002		05000
										05000

9. OPERATING  
MODE

1

## 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

10. POWER  
LEVEL

72

20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
20.2203(a)(1)	50.36(c)(1)(i)(A)	X 50.73(a)(2)(iv)(A)	73.71(a)(4)
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(vii)(A)	
20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

## 12. LICENSEE CONTACT FOR THIS LER

## NAME

Eric J. Miller - Nuclear Regulatory Affairs

## TELEPHONE NUMBER (Include Area Code)

570 / 542-3321

## 13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX
D	EE	UJX	L186	Y					

## 14. SUPPLEMENTAL REPORT EXPECTED

15. EXPECTED  
SUBMISSION  
DATE

MONTH DAY YEAR

YES (If yes, complete EXPECTED SUBMISSION DATE).

X NO

## 16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On September 30, 2002 with Unit 2 in Mode 1 (Power Operation) at 100% power, electricians working at an Uninterruptable Power Supply (UPS) inappropriately configured panel breakers in a manner that energized a large set of capacitors. A Reactor Recirculation pump runback caused by the resulting momentary electrical transient reduced power to 72%. The electrical transient also resulted in an Offgas system shutdown and a slow degradation of condenser vacuum. At 72% power, an automatic reactor scram occurred, in accordance with plant design, when the Main Turbine tripped on low condenser vacuum. The automatic Main Turbine trip occurred sooner than proceduralized setpoint information indicated it should have, thus precluding a manual intervention that was planned upon attainment of a predetermined condenser pressure. Poorly worded work instructions associated with the UPS panel work were responsible for the inappropriate breaker alignment. Additionally, a malfunctioning UPS panel breaker permitted establishment of the erroneous configuration despite breaker closure logic that should have prevented the alignment. ECCS was not challenged during this event. No abnormal operator actions were required to place the plant in a stable condition. The malfunctioning UPS panel breaker will be replaced. The plant procedure that governs work instruction development will be modified to improve the content and format of future work plans. Preventative maintenance tasks will be developed to ensure proper operation of the malfunctioning UPS panel breaker and other similar UPS breakers. Finally, turbine trip setpoint information contained in Operating procedures has been revised to reflect actual trip settings. This event is reportable for Unit 2 as an Unplanned RPS Actuation per 10 CFR 50.73(a)(2)(iv)(A). There were no actual adverse consequences to plant equipment or to the health and safety of the public as a result of this event.

# LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Susquehanna Steam Electric Station - Unit 2	05000388	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 3
		2002	- 004	- 00	

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

## EVENT DESCRIPTION

On September 30, 2002 at 22:10 with Unit 2 in Mode 1 (Power Operation) at 72% power, an automatic reactor scram occurred following a Main Turbine (EISS Code: TA) trip on low condenser vacuum (EISS Code: SH). Condenser vacuum had previously been compromised when the Offgas system (EISS Code: WF) shutdown in response to a momentary power transient that occurred during maintenance activities on a non-class 1E Instrument AC Uninterruptible Power Supply panel (UPS; EISS Code: EE). The electrical transient, which occurred at 100% power, also generated a runback signal to the Reactor Recirculation (EISS Code: AD) pumps that effectively lowered power to the 72% level. Attempts to re-establish the Offgas system prior to reaching the low condenser vacuum turbine trip setpoint were unsuccessful. Although plant operators (Licensed, utility) were prepared to manually scram the Unit, the actual automatic turbine trip occurred at a condenser pressure that was conservative to, but inconsistent with, trip setpoint information provided in Operating procedures, thus precluding a planned manual intervention. All control rods inserted fully. Reactor water level reached a minimum of -0.2 inches before recovering to normal levels (35 inches) using Feedwater (EISS Code: SJ). Both Reactor Recirculation pumps tripped per design via the End of Cycle - Recirculation Pump Trip (EOC-RPT) logic circuitry. Evidence of coolant temperature stratification soon became apparent when attempts to restart the Reactor Recirculation pumps were not immediately successful. The Reactor Pressure Vessel was then cooled in accordance with General Operating procedures. There were no Emergency Core Cooling System (ECCS) initiations and no Diesel Generator (EISS Code: EK) starts as a result of this transient. There were no challenges to Containment (EISS Code: NH). No abnormal operator actions were required to place the Unit in a stable condition.

## CAUSE OF EVENT

Calibration activities following a circuit board replacement on an uninterruptible power supply provided the initiating action to produce this event. Poorly worded work instructions caused plant electricians to inappropriately close Critical Bus AC Output Breaker (CB-3) at UPS 2D130 concurrently with a closed AC Bypass Input Breaker (CB-4; also at UPS 2D130). Contrary to a designed interlock between CB-3 and CB-4, a malfunctioning CB-3 undervoltage release mechanism permitted simultaneous closure of the two breakers. The combination of these two deficiencies produced an electrical configuration that energized a large UPS capacitor bank through the closed CB-4 and the momentarily closed CB-3 breakers. This resulted in a short, yet substantial, voltage drop on the power system as the capacitors tried to charge. Select plant equipment, including the Unit 2 Offgas Recombiner, shutdown during the perturbation. Loss of the Condenser Offgas system initiated a slow degradation in condenser vacuum that ultimately caused the Main Turbine trip and subsequent reactor scram. As was previously noted, the automatic Main Turbine trip occurred sooner than proceduralized setpoint information indicated it should have, thus precluding a manual intervention that was planned upon attainment of a predetermined condenser pressure.

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### ANALYSIS/SAFETY SIGNIFICANCE

This event is reportable per 10 CFR 50.73(a)(2)(iv)(A) for Unit 2 in that an unplanned system actuation occurred when the Reactor Protection System (EIS code: JC) initiated an automatic reactor scram following a Main Turbine trip. With the exception of the condenser low vacuum turbine trip setpoint (initiated a trip earlier than anticipated), all major equipment operated per design during the transient. Main condenser vacuum was restored shortly following the scram to maintain the condenser available for heat removal. Since Emergency Core Cooling Systems were not challenged and no abnormal operator actions were required to place the plant in a stable condition, there were no actual adverse consequences to the health and safety of the public as a result of this event.

In accordance with guidance in NUREG-1022, Revision 2, the due date for this report is November 29, 2002.

### CORRECTIVE ACTIONS

Key corrective action that has been completed:

- Correct turbine trip setpoint information contained in Operating procedures to reflect actual trip settings.

Key corrective actions to be completed:

- Create appropriate guidance for the development of work instructions and incorporate into station procedures. (i.e. Work Package Standards procedure (MI-PS-001)). Revise UPS work instructions to meet the new requirements.
- Replace CB-3 and CB-4 breakers in UPS panel 2D130.
- Develop Preventative Maintenance tasks for the malfunctioning Critical Bus breaker (CB-3) and other similar UPS breakers as required.

### ADDITIONAL INFORMATION

Past Similar Events: None

Failed Component: UPS Panel Critical Bus Breaker (CB-3)

Manufacturer: Liebert Corp

Model Number: FA650UICUL